Helsingin yliopisto - Helsingfors universitet - University of Helsinki ID 2000-452

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Työn nimi-Arbetets titel-Title
On the learnability of rational expectations equilibria in three business cycle models

Oppiaine-Läroämne-Subject
Economics

Työn laji-Arbetets art-Level	Aika-Datum-Month and year	Sivumäärä-Sidantal-Number of pages
Licentiate thesis	1999-09-01	75 s.

Tiivistelmä-Referat-Abstract
In this thesis we analyze the learnability of rational expectations equilibria in three general equilibrium business cycle models. The economic example business cycle models comprise the basic real business cycle model, an increasing returns model and a model with both static and dynamic complementarities. In these models the business cycles are driven by both shocks that affect the production technology and by taste shocks that affect the marginal rate of substitution between consumption and labor. In the two latter models we also analyze the existence and learnability of sunspot rational expectations equilibria.

The two learning methods that we apply here are the least squares algorithm and a gradient algorithm that takes only advantage of the gradient of the squared error objective. Generally, the aims of learning analysis can be the justification of a rational expectations equilibrium as an outcome of a reasonable and computable trial and error process, or a researcher's desire to select between equilibria in models with multiple rational expectations equilibria, or the analysis of the dynamics of so called equilibria in learning rules that may differ from the usual rational expectations equilibria. The analysis in this thesis concentrates on the former two objectives, but we also briefly present the principles of the study of equilibria in learning rules and the implications that our results have on that analysis.

In the thesis we prove that in the basic real business cycle model the unique rational expectations equilibrium is locally stable w.r.t. least squares learning for all admissible values of the model's structural parameters. Using computer programs we also find that for most relevant values of structural parameters in all three models the stability properties of the two learning algorithms coincide. However, we also find cases in which the learnability properties of the east squares learning method and the gradient learning method differ. This, however, happens only with such values of structural parameters for which the models do not depict well modern market economies.

In addition to the formulation of the learning setup and the stability analysis, the thesis contributes to the existence analysis of rational expectations equilibria and to the learnability analysis of different linearizations of nonlinear models. The latter issue is presented as comprising the two central caveats of this study in the concluding section. Their importance is highlighted by the fact that resolving these caveats seems essential even for the assessment of the thesis's results' importance. However, the two problems' evident complexity forces their closer analysis to be left for future research.

Avainsanat-Nyckelord-Keywords
business cycles - rational expectations
learning - economic models

Säilytyspaikka-Förvaringsställe-Where deposited

Muita tietoja-Övriga uppgifter-Additional information